Roll No. ....   **Total Pages : 03**

BT-4/M-20   **34112**

SOIL MECHANICS

CE-208N

Time : Three Hours]   [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting atleast one question from each Unit. Assume missing data, if any, suitably.

Unit I

1. (a) Discuss briefly the three basic clay minerals i.e. Kaolinite, Illite and Montmorillonite with sketches. **9**

(b) A sample of soil with G = 2.68 has a Porosity of 40%. Determine Dry unit weight, unit wt. of sample, when fully saturated, submerged unit wt. and Bulk unit wt. when the degree of saturation is 30%. **6**

2. (a) What do you understand by fine grained soils ? How are these soils classified as per I.S. soil classification? Describe.   **8**

(b) Describe pumping out tests in an unconfined aquifer for the determination of field permeability. **7**

(3)L-34112   **1**

Unit II

3. (a) What is, "Critical Hydraulic Gradient" ? Derive an expression for it, in terms of e, G of the soil. Also discuss Quick sand Phenomena. **9**

(b) Explain the phenomenon of piping. **6**

4. (a) Discuss the concept of "Optimum Moisture Content". Why does the dry density of soil increases first with increase in water content and then with further increase in water content beyond a certain limit, it decreases for the sample compactive effort ? Also discuss the effect of increase in compactive effort on maximum dry density and O.M.C. **9**

(b) How is compaction controlled in the field ? Discuss. **6**

Unit III

5. (a) Discuss BOUSSINESQ equation for vertical stress distribution due to a concentrated load at the ground surface and the assumptions made by him. **8**

(b) A water tower is supported only on three pillars forming an equilateral triangle with 6 m side. The total load of the tower is 120 Tonnes. Calculate vertical stress at a depth of 8 m below the ground under any *one* of the legs. **7**

(3)L-34112 2

6. (a) A layer of saturated soft clay is 4 m thick and lies under a newly constructed building. The pressure of sand overlying the clay layer is 1.6 kg/cm^2 and the new construction increase the pressure by 1.2 kg/cm^2. If the compression index of the clay is 0.6, compute the settlement. Water content of the clay is 30% and G = 2.7. **8**

(b) Describe one method of determining Coeff. C_v of consolidation of a soil. **7**

Unit IV

7. (a) Bring out the relationship between principal stresses at failure and the shear strength parameters. **8**

(b) Discuss various types of Triaxial compression Tests based on drainage conditions. **7**

8. Describe the following :

(a) Rankine's Active and Passive states of plastic equilibrium. **8**

(b) Culmann's Graphial construction for determining Active Earth pressure for a retaining wall with a sloping cohesionless backfill. **7**